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INTERNATIONAL APPLICATION PUBLISHED UNDER THE PATENT COOPERATION TREATY (PCT)

(51) International Patent Classification 6 : H04Q 7/08 — A1

(11) International Publication Number: WO 97/01252

(43) International Publication Date: 9 January 1997 (09.01.97)

(21) International Application Number: PCT/US96/10481

(22) International Filing Date: 21 June 1996 (21.06.96)

(30) Priority Data:
08/493,470 22 June 1995 (22.06.95) US

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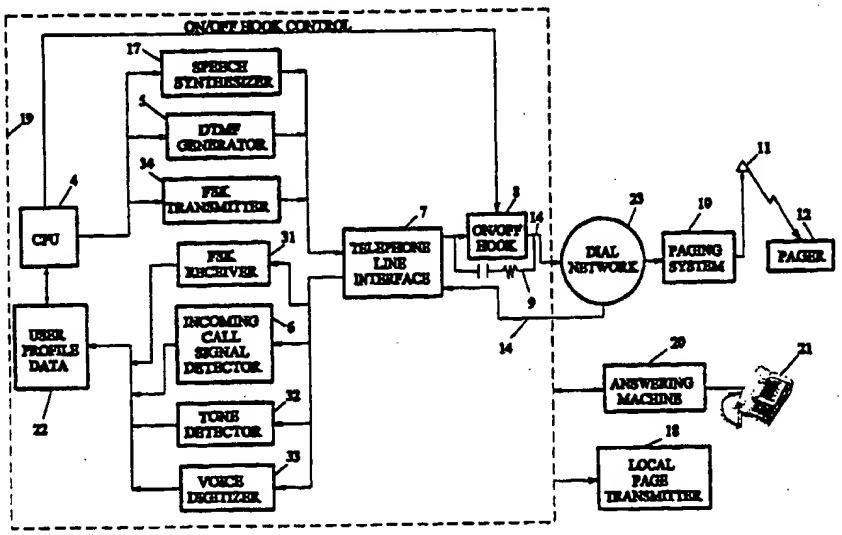
(81) Designated States: BR, CA, JP, KR, European patent (AT, BE, CH, DE, DK, ES, FI, FR, GB, GR, IE, IT, LU, MC, NL, PT, SE).

Published
With international search report.
Before the expiration of the time limit for amending the claims and to be republished in the event of the receipt of amendments.

(54) Title: METHOD AND APPARATUS FOR PAGING BASED ON CALLER ID



(57) Abstract

The present invention utilizes caller ID information from an incoming call to a telephone subscriber to automatically call a paging system (10) and page the subscriber if the subscriber satisfies predetermined criteria. The caller ID information is sent to the paging system (10) and transmitted to the paged subscriber to identify the caller. Such capabilities are utilized to automatically call back the calling party, or initiate a conference call by placing the caller on hold, paging the called party, and initiating a conference call when the called party answers the page. Further, the present invention transmits the proper original calling party information to a forwarding destination when call forwarding or transfer is utilized by the called party. Various embodiments are incorporated in: an answering machine (20) or voice mail system, adjunct boxes, local central offices, or alphanumeric paging and terminal equipment systems.

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Method and Apparatus for Paging Based on Caller ID

BACKGROUND OF THE INVENTION

Technical Field

The present invention pertains to improvements in methods and apparatus for utilizing incoming calling line identification (ICLID) information, referred to as "caller I.D.". In particular, the present invention is an improvement of the method and apparatus disclosed in U.S. Patent No. 5,206,900 (Callele) which is expressly incorporated herein by reference in its entirety.

Discussion of Prior Art

Callele (5,206,900) discloses apparatus at a called party's telephone for performing various actions, including "caller ID forwarding", based on ICLID information retrieved from a telephone line when that party is called. Typically, and referring to Fig. 1, the ICLID information includes the dialable number of the calling party. Specifically, a telephone line interface 3 is coupled to an ICLID receiver 1 and ICLID transmitter 2. Telephone line interface 3 provides the appropriate electrical termination characteristics for an

It is another object of the present invention to automatically transmit the calling party information and any other call related data of the caller to a paging system to thereby avoid the potential for human error in manually entering the calling party information or any other call related data into the paging system.

It is a further object of the present invention to enable a caller to reach a called party who is not near the called telephone by only dialing a single telephone number (as opposed to first calling the party, and then, if the party does not answer the call, calling a paging system), thereby avoiding the charge by the telephone company for the additional call unless an answering machine responds to the first call.

Still another object of the present invention is to enhance the function of telephone answering machines or voice mail systems by capturing the calling party information and linking telephone messages with the calling party information to identify callers who do not leave a name or message or who leave incomprehensible messages. Further, individual messages may be retrieved by the called party upon entering the name, telephone number or special code of a particular caller leaving the message.

It is another object of the present invention to enhance the function of telephone switches or adjunct boxes of telephone switches by capturing the calling party information and invoking a page to notify the called person of the call.

Yet another object of the present invention is to enhance an alphanumeric paging or terminal equipment system by capturing the calling party information and either invoking a page, prompting the caller for information, or transferring the caller to an operator.

According to a first embodiment of the present invention, calling party information (typically containing the telephone number or name and telephone number of a calling party) is captured from information transmitted with the call. Such information transference is currently being phased into most systems and is known as "caller I.D." (other types of information may be used including class services, ANI, etc). As used herein, the term "calling party information" refers to the telephone number or the combination of the name and telephone number of the calling party. After the call is terminated, a communication line is seized by the non-answering called station to call a pre-programmed telephone number of a paging system to which the calling party information is transmitted. Further, any other alphanumeric information received by modem at the called station can be transmitted to the paging system via the modem. The paging system then, in a conventional paging operation, transmits to the called party the calling party information. If no calling party information is captured, the called party may either be paged and notified of a call and whether or not the call has been answered by a telephone answering machine or voice mail system, or alternatively, the initial caller may be voice prompted to enter by touchtone the calling party information and any other alphanumeric information to send to the pager. Further, the captured calling party information may be converted to speech and transmitted to a caller where voice prompts may be used to have the caller modify or add, via touchtone, alphanumeric information sent to the pager, or the voice prompts may be used for modification of information when a name or telephone number of a caller is different from the captured calling party information.

In addition, in accordance with the present invention the captured calling party information may be transmitted to a forwarding destination, in instances where call forwarding or transfer is available, to ensure receipt of calling party information pertaining to the original caller. Further, the present invention may place the calling party on hold in order to page the called party with the calling party information. The called party may then call back and have the present invention initiate a conference call between the called party and the calling party on hold. Additionally, if the calling party has terminated the call or at the called party's option, an integrated device (i.e., pager-phone, pager dialer) may be used to automatically call back the calling party at any desired future time.

According to a second embodiment of the present invention, a telephone answering machine or voice mail system is employed with additional capabilities of capturing the calling party information to coordinate voice messages. The calling party information, date, and time of a call are stored whereby a link is maintained between the captured calling party information and any messages left by the caller. The captured calling party information may then be utilized to contact the caller upon a request from the called party at a remote location and form a conference call between the remote called party and the caller, or to identify callers who do not leave a name or message or who leave incomprehensible messages. The present embodiment may convert the captured calling party information to speech in order to convey the information to a person calling to retrieve the messages. That person can enter the name, telephone number, or code (via touchtone or voice) of a particular caller who may have left a message, eliminating the

need to listen to all messages if only one is being sought. Further included is the paging and call forwarding or transfer capabilities of the first embodiment described above.

According to a third embodiment of the present invention, an adjunct box coupled to computerized call handling equipment or a switch in a private branch or computerized branch exchange (PBX/CBX) is enhanced by employing the paging, call forwarding or transfer, conference call and automatic callback capabilities of the first embodiment described above. Further, the paging, call forwarding or transfer, conference call and automatic callback capabilities of the first embodiment may be accomplished by the computerized call handling equipment through a software enhancement to the computerized call handling equipment or switch software, or by the combination of an adjunct box and computerized call handling equipment or switch software. Alternatively, the adjunct box may further be coupled to a local page transmitter to directly forward the calling party information to a pager without traversing a dialing network.

According to a fourth embodiment of the present invention, the paging, call forwarding or transfer, conference call, automatic callback and answering or voice mail capabilities of the first and second described embodiments are included in a local central office. An adjunct box having the aforementioned paging, call forwarding or transfer, conference call, automatic callback and answering or voice mail capabilities is coupled to a local central office switch within a dial network. Further, the capabilities of the present embodiment can be accomplished entirely within the central office switch by a software enhancement or by a combination of both the adjunct box and central office switch software. Call progress data is

captured and the calling party information of the incoming call within the call progress data is sent to a remote paging system over a national dial network. Alternatively, the calling party information and any other call related data may be sent directly to a local paging system from the local central office switch.

According to a fifth embodiment of the present invention, an alphanumeric paging or terminal equipment system may be enhanced by an adjunct box coupled to specialized call handling equipment (i.e., ACD), by a software enhancement to the specialized call handling equipment, or by a combination of both an adjunct box and specialized call handling equipment software. The adjunct box captures call progress data and prompts the caller, via voice prompts, to assent to having calling party information within the call progress data transmitted to a pager. If there is no calling party information within the call progress data, or the caller does not assent, the specialized call handling equipment transfers the caller to an operator to obtain the necessary information to be sent to the pager.

The above and still further objects, features and advantages of the present invention will become apparent upon consideration of the following detailed description of specific embodiments thereof, particularly when taken in conjunction with the accompanying drawings wherein like reference numerals in the various figures are utilized to designate like components.

BRIEF DESCRIPTION OF THE DRAWINGS

Fig. 1 is a block diagram of a prior art apparatus for retrieving ICLID information.

Fig. 2 is a state diagram of the actions taken by prior art the apparatus of Fig. 1 based on the ICLID information state.

Fig. 3A is a block diagram of a general configuration of the automatic paging system according to the present invention.

Fig. 3B is a block diagram of an apparatus for paging based on incoming call information according to the present invention.

Fig. 3C is an operational flow chart of the paging capability of the present invention.

Fig. 3D is a flow chart of the alternative actions taken by the apparatus of Fig. 3A based on the state of the ICLID information.

Fig. 4 is a block diagram of a device embedded within a telephone answering machine or voice mail system employing calling party information according to the present invention.

Fig. 5A is an operational flow chart of the answering machine or voice mail system of Fig. 4 for processing an incoming call.

Fig. 5B is an operational flow chart of the answering machine or voice mail system of Fig. 4 for retrieving messages for a subscriber.

Fig. 6 is a block diagram of an adjunct box in computerized call handling equipment or a switch employing paging based on call progress information according to the present invention.

Fig. 7 is a block diagram of an adjunct box in a local central office employing paging based on call progress information according to the present invention.

Fig. 8A is a block diagram of an enhanced alphanumeric paging system utilizing call progress information according to the present invention.

Fig. 8B is an operational flow chart of the alphanumeric paging system of the present invention.

DESCRIPTION OF THE PREFERRED EMBODIMENTS

A first embodiment of the present invention is described with reference to Figs. 3A, 3B, 3C, 3D. Generally (Fig. 3A), an incoming call is detected by a call occurrence data receiver 35, and caller information transmitted with the incoming call is conveyed to a processor 37. Processor 37 stores the information in a data storage memory 43 and determines what action is to be performed (Fig. 3D) based on the information transmitted with the call and other criteria stored in memory 43. If processor 37 determines that a page is necessary, a paging system is accessed via call occurrence transmitter 41, and the calling party information and any other desired call information is transmitted to the paging system. Information (criteria, messages, calling party information etc.) stored in data storage memory 43 can be modified via data input device 39.

Specifically (Fig. 3B), an automatic paging device 19 at a subscriber telephone location is connected to telephone, transmission or communication medium or line 14 of the type that may be analog, digital, RF, wireless, a cellular transceiver, or other (e.g., POTS, Centrex, ISDN, etc.). An incoming call to the subscriber traverses telephone line interface 7, providing proper electrical termination characteristics, and continues on to an incoming call signal (i.e., ring) detector 6. Incoming call signal detector 6

senses the presence or absence of an incoming call signal (nominally 88V AC superimposed on -48V DC in the case of the POTS ring signal) and signals a CPU 4 programmed to respond to the call. FSK (Frequency Shift Key) receiver 31 retrieves ICLID information from telephone line interface 7 and converts it to a TTL level bit stream for conversion to ASCII format by CPU 4 for storage. Although all of the disclosed embodiments of the invention utilize ICLID information and call progress data, any data transmitted that includes a telephone number or name and telephone number of a calling party may be utilized (e.g., ANI, Class services, caller ID etc.). AC pass-through circuit 9 permits capture of the ICLID information without answering the call (i.e., without the telephone going off-hook at circuit 8). After retrieving the ICLID information, CPU 4 may take any of a number of actions based on the state of the ICLID information (Fig. 3D) as described below. Typically, if the ICLID information is retrieved, CPU 4 may seize control of telephone line 14 to transmit either a confirmation tone (if ICLID information is known) via DTMF (Dual Tone Multi-Frequency) generator 5, or a dial pulse generator, or a speech message from a conventional answering device to the caller indicating that the calling party information, other data within the ICLID information, or other call related data are being sent to a pager. Alternatively, the caller may be asked if the caller desires the information to be sent to the pager. The confirmation tone is transmitted sufficiently quickly to avoid the caller being charged by the telephone company. Alternatively, CPU 4 may direct voice prompts to the caller from speech synthesizer 17 to retrieve and store messages via voice digitizer 33. Noise on telephone line 14 is compared, by software in CPU 4, to ring, voice or to other noise to

determine if telephone line 14 is available. Further, other methods may be implemented to determine the availability of telephone line 14. Alternatively, hardware (not shown) in the form of a sensor for on/off hook detection may be employed for this line availability determination.

Once telephone line 14 becomes available, CPU 4 seizes control of telephone line 14 by causing on/off hook control 8 to go off-hook. The seizure process continues until either a dial tone is detected by tone detector 32 or a certain period of time elapses. CPU 4 sends a telephone number of paging system 10 that has been stored in memory to DTMF generator 5 (or a dial pulse generator) where that telephone number is converted to touchtones (or dial pulses) transmitted to dial paging system 10 through dial network 23. If paging system 10 does not answer or the line is busy, the telephone number is periodically redialed. Paging system 10 transmits a start tone back to the automatic paging device 19 to indicate readiness for receipt of a telephone number for transmission to a pager 12. Upon detection of the start tone by tone detector 32, or after a predetermined time period, CPU 4 transmits the calling party information and any desired additional alphanumeric information (time, date, etc.), using one of several known alphanumeric encoding techniques, to DTMF generator 5 to be converted to touchtones and transmitted to paging system 10. Such alphanumeric encoding techniques are well known in the art and one such technique is described in U.S. Patent No. 4,427,848 (Tsakinikas) expressly incorporated herein by reference in its entirety. Alternatively, a transmitter modem 34 may transmit the calling party information and other alphanumeric data to the paging system using a pre-arranged protocol (i.e., TAP). Paging system 10 transmits the calling

party information and alphanumeric information to pager 12 via antenna or RF network 11.

If no confirmation tones are received from paging system 10 after transmission of the calling party information and alphanumeric information, then automatic paging device 19 may repeat the procedure of dialing and transmitting the calling party information and alphanumeric information to paging system 10. The effect of device 19 is equivalent to the caller having called paging system 10 directly or, in the case of modems, the effect is equivalent to that of paging software in personal computers. Alternatively, automatic paging device 19 may transmit the information to a local paging transmitter 18 to page a called party locally (i.e., within a factory, plant or other contained area or facility at which paging device 19 is located).

Further features of automatic paging device 19 may be implemented in software using CPU 4. Specifically, the user may control forwarding calls to the pager or not based on: whether the call gets answered; or a message is left; or the ICLID information is received; or the user has a preference; or the name or telephone number of the calling party has been pre-selected; or time or calendar designations have been pre-specified; or any other criteria as specified by the user in user profile or database 22.

Sophisticated call screening may be accomplished by CPU 4 utilizing a list or database to determine the state of ICLID information (Fig. 3D). Specifically, CPU 4 compares the captured calling party information within the ICLID information to a telephone number/name list or database 22 and actuates the paging system or not based on the comparison. In this regard, the database provides various selection criteria to evaluate

whether the called party is paged based on characteristics of the caller (i.e. telephone number, name, customer, vendor, etc.). Also, data may be forwarded to more than one paging system or pager. Further, the captured calling party information may be converted to speech and transmitted to the calling party where the calling party may modify or add to the information sent to the pager during a call or modify the information when a name or telephone number of the calling party is different from the captured calling party information. Alternatively, a separate answering machine or voice mail system may be used in conjunction with the present embodiment to query whether or not the calling party desires to enter different or modified data, or to query whether or not the calling party desires a page. The calling party enters the modified or additional information from a remote telephone via touchtones in response to voice prompts. Methods for retrieving alphanumeric information from touchtone telephones are well known in the art as described above.

Additional data retrieved from a database 22 may be forwarded to paging system 10 other than the telephone number of the caller. Any additional information residing within the retrieved ICLID information may also be transferred. Further, CPU 4 may retrieve information to be forwarded to paging system 10 from database 22 using the ICLID information as a key. Alternatively, an information database may reside at paging system 10 where information is retrieved based on the ICLID information sent to paging system 10.

The telephone number of paging system 10 and the user-specified criteria are both stored in user profile or database 22, are user programmable, and may be entered and modified via a keyboard, local or remote touchtone phone, modem signals,

remote interactive voice response system (not shown) with forwarding to profile or database 22 (via modem, DTMF or other signaling means), or any other input means. Further, a programmer such as a PROM burner may be implemented with a computer controlling the telephone numbers programmed.

The embodiment illustrated in Figs. 3A and 3B may also be used on calls not accompanied by ICLID information (i.e. ICLID unavailable, suppressed or error). Specifically, a page may be initiated as described above to notify the called party of a call, and whether or not a message was left. An incoming call is considered to have left a message (if the device is not incorporated into an answering system) when the duration of the call is longer than a predetermined period of time. Alternatively, regardless of the presence of ICLID information, the device may go off-hook to prompt the caller for a message and telephone number to be transmitted to a pager as described above or to inquire if the calling party wants the called party paged. A more cost effective prompting procedure may be to utilize a separate answering machine or voice mail system in conjunction with the present embodiment to prompt the caller during a greeting message for a message and telephone number to be transmitted to a pager as described above.

The embodiment illustrated in Figs. 3A and 3B, in combination with computers or telephone devices, also provides other enhanced capabilities. Specifically, the embodiment may be utilized with telephone answering machine or voice mail system 20 to page a called party to inform him/her of a received call and any possible messages. Also, fax machines may utilize the embodiment to provide for a receiving station to be paged by a transmitting station in order to coordinate the transmission of data. Further, the embodiment of Figs. 3A and 3B may be utilized with cellular phones, whereby a person

having a pager and a cellular phone or a pager built into a cellular phone may be paged to turn on the cellular phone for an incoming call, or the cellular phone, telephone or other call back device may call back the caller if the telephone number was sent. The cellular telephone may be enabled manually by the person, or enabled automatically by the pager either unconditionally or after the person assents to receiving the incoming call following review of the calling party information sent to the pager. The incoming call creating the page may be followed by a conference call initiated by the present embodiment as described below, may be a call from the present embodiment to relay stored voice messages or other synthesized speech messages, or may be a call directly from a calling party. Further, the cellular phone, telephone or other call back device may call back the present embodiment for message retrieval or a conference call (as described below). Alternatively, the cellular phone, telephone or call back device may call back the calling party presently or at some future time, or call the present embodiment first and then the calling party at some future time.

A further application of the Fig. 3A embodiment includes call forwarding or transfer. Typically, many telephone subscribers have call forwarding or transfer service to voice mail systems. These voice mail systems may page a customer to notify him/her of a voice mail message, may relay the voice message to a voice pager, or may capture the calling party information or have the caller enter the calling party information. However, call forwarding or transfer effects a relay of calling party information for the forwarding or transferring location and not for the original calling party. Therefore, the subscriber who forwards or transfers calls to

the voice mail system receives calling party information of his/her own telephone. An enhanced feature provided by the present invention includes forwarding or transferring information about the original calling party, either back through the dial network as part of the call or of the transfer signaling information, or as a separate dialed call from the device or central office switch. In the case of a separate call, the voice mail system stores the original calling party information received in the separate call with any voice message, text or other information received in the transferred call by matching the substantially similar received called party telephone numbers (the called party telephone number is received at the voice mail system twice, once for each of the transferred and separate calls) and maintaining a link. This information may be sent to the pager, stored with the message for later selection and retrieval, used for screening calls or selective paging, or used to perform any other function as described above. The voice mail system may distinguish the additional separate call by signal detection after answering the call, or alternatively receiving the additional separate call on a separate dedicated DID (direct inward dial) telephone number. The application of call forwarding or transfer to voice mail systems is by way of example, and the present embodiment may forward or transfer calls to different destinations or systems.

Yet another application of the Figs. 3A, 3B embodiments includes the capability of entertaining conference calls. Specifically, a calling party is placed on hold and the called party is paged with the captured calling party information. The calling party may be prompted as to whether or not a page is desired. The called party having determined to communicate

with the calling party based on the received calling party information, calls back the embodiment and a conference call is initiated between the called party, the calling party on hold, and the embodiment. Further, if the calling party terminates the call or upon the called party's option, an integrated device (i.e. a pager-telephone, pager-dialer, etc.) may be used to store the received calling party information and automatically call back the calling party at a desired future time. A single integrated device (i.e. pager-cellular phone, etc.) may call back the embodiment to retrieve messages or initiate a conference call, or call back the calling party directly.

All of the components illustrated in Figs. 3A and 3B, are commercially available and well known in the art. Alternatively, the FSK receiver 31, incoming call signal detector 6, tone detector 32, voice digitizer 33, and modem (not shown) may be implemented by a combination of software residing in CPU 4 and an A/D converter. Similarly, FSK transmitter 34, speech synthesizer 17, and DTMF generator 5 (or a dial pulse generator) may be implemented by a combination of software residing in CPU 4 and a D/A converter.

A second embodiment of the present invention is described with reference to Figs. 4, 5A and 5B. This embodiment is directed toward a telephone answering machine or voice mail system 20 utilizing ICLID information to provide enhanced capabilities. Specifically, an incoming call, signal or message is received on telephone line 14 and routed through telephone line interface 7 and an analog to digital conversion section of codex 15 to CPU 4. Telephone line 14 may be any type of communication line as described above. CPU 4 captures ICLID information containing the calling party identification,

determines the date and time of calls and stores this information in memory 16 where a link is maintained between a message (or message slot if no message was left) and the calling party information.

A subscriber may call in to the telephone answering machine or voice mail system to retrieve messages, and if the subscriber desires to contact a caller who leaves a message, a conference call can be formed by CPU 4 retrieving the calling party information from memory 16 and transmitting it to a digital to analog conversion section of codex 15 where the telephone number is converted to touchtones for dialing. CPU 4 goes off-hook to seize control of telephone line 14 for dialing by providing a control signal to on/off hook control 8 (containing either conference call capabilities or a second line). This allows a subscriber to place a single telephone call to reach a caller, and further permits long distance calls through the telephone answering machine or voice mail system 20 from a remote location.

The telephone answering machine or voice mail system 20 may convey caller information over the telephone to a person retrieving his/her messages. Specifically, CPU 4 seizes control of telephone line 14 via on/off hook control 8, retrieves information from memory 16 and transmits it through the digital to analog converter section of codex 15 where the information is sent as synthesized speech over telephone line 14 to the caller. Further, the messages may be retrieved individually by entering, via touchtones, a name, telephone number or special code of a caller leaving a message.

The telephone answering device or voice mail system 20 may also identify persons not leaving a message, not leaving a name in their message, or leaving incomprehensible messages.

Specifically, CPU 4 compares the calling party information of a particular call to calls stored in memory 16, or to a prestored telephone directory, in order to identify such callers if the name of the caller is not present in the message or if the name in the message is different from the name in the calling party information. The telephone answering machine or voice mail system 20 conveys the identity of the caller by speech or other display means to the user or other automated systems (E-mail, paging system, etc.).

Alternatively, the embodiment illustrated in Fig. 4 may be embedded within voice/data switches to enhance voice mail services. In this configuration, the functions described above are implemented either in software, separate adjunct devices connected to a central office switch, or a combination of adjunct devices and software.

The embodiment illustrated in Fig. 4 may be implemented in several alternative configurations. The components may all be implemented by discrete devices including a DTMF generator and receiver, an FSK modulator or generator and receiver or demodulator, a speech synthesizer and a ring detector. These devices may also be implemented by the combination of software in CPU 4 and codex 15. Further, speech synthesis can be accomplished using a separately answered device (i.e., an answering machine).

The components illustrated in Fig. 4 are all commercially available and well known in the art. Further, the telephone answering machine or voice mail system of this embodiment may incorporate the paging and call forwarding or transfer functions of the first embodiment described above to page a person and notify him/her of a call and whether or not a message was left as determined from the duration of the call.

A third embodiment of the present invention is described with reference to Figs. 3B, 6. Northern Telecom produces a device known in the art as an adjunct box with the capability of obtaining call progress information from telephone switches. Similar devices are available for other switch manufacturers. This embodiment incorporates the calling party information capture, pager, call forwarding, conference call and automatic callback functions of the first embodiment described above into an adjunct box, or equivalently as software in digital switches in private branch exchanges, computerized branch exchanges, call handling equipment (i.e. ACD, paging terminal, voice mail, etc.) or as a combination of both adjunct boxes and software. Specifically, adjunct box 50 retrieves the calling party information from call progress information (calling party name and telephone number, called party name and telephone number, call answered information, duration, forwarding information, etc.) received from computerized call handling equipment or switch 60 (typically in a private or computerized branch exchange). Adjunct box 50 compares the call progress information to user-specified paging criteria in a subscriber profile feature data file or database 22 to determine if a particular subscriber is to be paged and the information to be sent. If the subscriber is to be paged, adjunct box 50 seizes control of outgoing telephone line 14 (typically a trunk line or as described above), dials or otherwise connects paging system 10 through dial network 23 (or a dedicated network or leased line) using a pre-stored telephone number, and transmits the calling party information and any other desired information to paging system 10 to be transmitted to a pager. The determination of whether or not to page a subscriber further requires a list of telephone numbers or line card addresses and

optional user profiles residing in the computerized call handling equipment or switch to select only calls made to certain telephone numbers supported by the computerized call handling equipment or switch (or supported by a corresponding central office). Alternatively, adjunct box 50 retrieves the call progress information as described above and transmits the calling party information and any other desired information directly to local paging transmitter 18 to transmit the information to a pager. The pre-stored telephone number, desired information, and user-specified paging criteria may be entered and modified as described above in the first embodiment.

A fourth embodiment of the present invention incorporates the calling party information capture, pager, call forwarding or transfer, conference call and automatic callback, and call answering capabilities of the first and second embodiments described above into adjunct boxes of local central offices as shown in Fig. 7, or equivalently as a software enhancement in the central office switch, or as a combination of both an adjunct box and central office switch software. Specifically, adjunct box 50 is connected to a local central office switch 26 embedded within a local central office 25 of dial network 23. Adjunct box 50 receives call progress information (calling party name and telephone number, called party name and telephone number, call answered information, duration, forwarding information, etc.) from local central office switch 26 and extracts the calling party information and any other desired call related data. The call progress information is compared to user-specified paging criteria in local subscriber profile feature data file or database 22 to determine whether or not a particular subscriber is to be paged. If the

subscriber is to be paged, adjunct box 50 seizes control of outgoing telephone line 14 (typically a trunk line as described above), dials a remote paging system 10 through national dial network 24 using a pre-stored telephone number, and sends the calling party information and any other desired information to paging system 10 for transmission to a pager. Alternatively, adjunct box 50 retrieves the call progress information as described above and transmits the calling party information and any other desired information directly to local paging system 18. The pre-stored telephone number, desired information, and user-specified paging criteria may be entered and modified as described above in the first embodiment.

A fifth embodiment of the present invention is described with reference to Figs. 8A, 8B. This embodiment enhances alphanumeric paging and terminal equipment systems by incorporating the conference call and automatic callback features of the first embodiment as described above into adjunct box 50. Specifically, adjunct box 50 is connected to specialized call handling equipment 63 (i.e. ACD etc.) receiving call progress information (calling party name and telephone number, called party name and telephone number, call answered information, duration, forwarding information, etc.) from central office 25. Adjunct box 50 may be implemented by software enhancements in the specialized call handling equipment or by a combination of the adjunct box and specialized call handling equipment software. Adjunct box 50 captures the calling party information and other information from the call progress information and compares the information to user-specified paging criteria in subscriber profile feature data file or database 22 to determine whether or not a particular subscriber is to be paged. If the subscriber is to

be paged, the caller is prompted to indicate whether the calling party information from the call progress data is to be transmitted to a pager. If the caller responds affirmatively by touchtone, adjunct box 50 seizes control of outgoing telephone line 14 (typically any of the types of telephone lines described above including local or wide area networks and direct or leased lines), dials paging system 10 through dial network 23 using a pre-stored telephone number, and transmits the calling party information to paging system 10 as described above. Alternatively, adjunct box 50 may transmit the calling party information directly to a local, national or worldwide paging network 18. If the caller either fails to meet the user-specified criteria, does not have calling party information in the call progress information, or desires to send different calling party information, specialized call handling equipment 63 transfers the caller to operator equipment 62 where an operator retrieves the necessary information from the caller. Alternatively, automatic information retrieval may be accomplished by voice prompting the caller and utilizing touchtone, speech recognition, or speech capture equipment to retrieve the information. If the caller satisfies the user-specified criteria, the operator or automatic information retrieval equipment may effectuate a page. The caller may also be transferred to an operator if there is no answer by the specialized call handling equipment. The pre-stored telephone number and user-specified paging criteria may be entered and modified as described above in the first embodiment.

It will be appreciated that the embodiments described above and illustrated in the drawings represent only a few of the many ways of implementing paging based on automatic caller

telephone number retrieval. The preferred embodiments may be implemented using any data transmitted with an incoming call that includes the telephone number or the name and telephone number of the caller.

The first described embodiment of the present invention may be implemented as a stand alone device or a peripheral of a host computer or other processing means. The foregoing embodiments may be implemented by any and all means capable of reception, transmission, processing, and storage to or from a communication network.

The second embodiment of the present invention may be implemented utilizing discrete electronic components, magnetic tape, digital signal processing, software or any other means performing similar functions.

Although the described embodiments call for embedding components in specific devices, the present invention is not limited to those particular devices. The present invention may be applied to any and all telephone or computer devices where communication to a party is desired. Further, functions of various hardware components of the various embodiments may equivalently be accomplished in software.

From the foregoing description, it will be appreciated that the invention makes available a novel method and apparatus for paging based on calling party information retrieval wherein calling party information from an incoming call is retrieved and then transmitted to a paging system in order to notify a person that an incoming call has been received.

Having described preferred embodiments of a new and improved method and apparatus for paging based on caller ID, it is believed that other modifications, variations and changes will be suggested to those skilled in the art in view of the

teachings set forth herein. It is therefore to be understood that all such variations, modifications and changes are believed to fall within the scope of the present invention as defined by the appended claims.

What is Claimed is:

1. A method of automatically paging a telephone subscriber in response to a telephone call from a calling party to the subscriber's telephone on a telephone line connected to a public switched telephone network, said method comprising the steps of:

(a) determining whether or not the incoming call is accompanied on the telephone network by signaling information including the telephone number or name and telephone number of the calling party;

(b) in response to a determination in step (a) that the incoming call is accompanied by said signaling information:

(b.1) converting said signaling information to speech signals instructing the calling party to modify said signaling information if desired by the calling party;

(b.2) transmitting said speech signals to said calling party via said telephone line;

(b.3) receiving the calling party's modified signaling information; and

(b.4) from the received modified signaling information, storing the calling party's telephone number or name and telephone number;

(c) in response to a determination in step (a) that the incoming call is not accompanied by said signaling information, transmitting a voice prompt to the calling party via said telephone line to instruct the calling party to transmit back to the subscriber telephone via said telephone line the calling party's telephone number or name and telephone number;

(d) in response to step (c), receiving and storing said telephone number or said name and telephone number of the calling party at the subscriber's location;

(e) following storage of the calling party's telephone number or name and telephone number pursuant to steps (b) or (d), waiting for the telephone line at the subscriber's telephone to be free and then placing the subscriber's telephone in an off-hook condition and automatically initiating a further call to a paging system by dialing a pre-stored telephone number of the paging system;

(f) in response to the paging system answering said further call, transmitting, via the telephone line, coded information identifying said telephone subscriber and the stored telephone number or name and telephone number of the calling party; and

(g) at the paging system, in response to receiving the coded information in step (f), paging the subscriber and transmitting said calling party's telephone number or name and telephone number to the paged subscriber.

2. In a telephone answering machine or voice mail system at a subscriber telephone, an apparatus for capturing information of an incoming call transmitted with said incoming call comprising:

memory means for storing messages and data corresponding to said incoming call;

capture means for capturing said information and storing a telephone number or a name and telephone number, time, and date of a caller from said information in said memory means; and

processor means for analyzing data in said memory means to identify callers and retrieve said messages.

3. The apparatus of claim 2 wherein said processor means includes means for matching a telephone number or name of a caller to telephone numbers or names of previous callers or to a prestored telephone and name list, in said memory means, to identify a caller who cannot be identified solely by a message stored in said memory means.

4. The apparatus of claim 2 further comprising speech synthesizing means to convert said data in said memory means to speech to convey said data to a caller.

5. The apparatus of claim 2 wherein said processor means includes means for retrieving said messages based on a name, telephone number, or code entered by a caller.

6. The apparatus of claim 2 further comprising access means responsive to a current call, and to a message from a previous caller stored in said memory means, for calling said previous caller via a conference call between the current caller, the previous caller and the subscriber telephone.

7. In a telephone answering machine or voice mail system at a subscriber telephone, a method for capturing information of an incoming call transmitted with said incoming call comprising the steps of:

(a) capturing said information and storing a telephone number or a name and telephone number, date, and time of a caller from said information in a memory;

(b) storing in said memory a voice message left by said caller; and

(c) analyzing data in said memory to identify callers and retrieve said messages.

8. The method of claim 7 wherein step (c) comprises matching a telephone number or name and telephone number of a caller to telephone numbers and names of previous callers or to a prestored telephone list, in said memory, to identify a caller who cannot be identified solely by a message stored in said memory.

9. The method of claim 7 further comprising the step of converting said data in said memory to speech to convey said data to a caller.

10. The method of claim 7 wherein step (c) further comprises retrieving said messages from said memory based on a name, telephone number or code entered by a caller.

11. The method of claim 7 further comprising the step of:

in response to a current call and to a message from a previous caller stored in said memory, calling said previous caller to form a conference call between the current caller, the previous caller and the subscriber telephone.

12. In an adjunct box in a private or computerized branch exchange or in a local central office, an apparatus for capturing information transmitted with an incoming call and invoking a paging system, comprising:

server means for determining whether said exchange or office serves said incoming call;

capture means responsive to said server means for capturing said information of said incoming calls that are served by said exchange or office and storing a telephone number or name and telephone number of a caller from said captured information;

comparing means for comparing said information to pre-stored user-specified criteria;

access means responsive to said comparing means for accessing said paging system, via a communication line, based on said information satisfying said user-specified criteria; and

transmission means for conveying said telephone number or said name and telephone number to said paging system via said communication line for transmission of said telephone number or said name and telephone number to a pager.

13. The apparatus of claim 12 wherein said access means comprises dialing means for dialing a pre-stored telephone number to access said paging system.

14. The apparatus of claim 12 wherein said access means includes a cellular connection to access said paging system.

15. The apparatus of claim 12 wherein said access means includes an RF network connection to access said paging system.

16. The apparatus of claim 12 further comprising input means for entering additional information to be sent to said paging system, wherein said transmission means conveys said

telephone number or name and telephone number and said additional information to said paging system.

17. The apparatus of claim 13 further comprising modifying means for modifying said pre-stored telephone number, said additional information, and said user-specified criteria.

18. In an adjunct box in a private or computerized branch exchange or a local central office, a method for capturing information transmitted with an incoming call and invoking a paging system comprising the steps of:

(a) determining whether said exchange or office serves said incoming call;

(b) capturing said information of said incoming calls that are served by said exchange or office and storing a telephone number or name and telephone number of a caller from said captured information;

(c) comparing said information to pre-stored user-specified criteria;

(d) accessing said paging system via a communication line based on said information satisfying said pre-stored user-specified criteria; and

(e) conveying said telephone number or name and telephone number to said paging system via said communication line for transmission of said telephone number to a pager.

19. The method of claim 18 wherein said step (d) comprises dialing a pre-stored telephone number to access said paging system.

20. The method of claim 18 further comprising the step of entering additional information to be sent to said paging system, wherein said step (e) conveys said telephone number or name and telephone number and said additional information to said paging system.

21. In an alphanumeric paging system, an apparatus for capturing information transmitted with an incoming call and invoking a paging system, comprising:

capture means for retrieving said information transmitted with an incoming call;

comparing means for comparing said information to pre-stored user-specified criteria;

query means responsive to said comparing means for prompting a caller based on said information satisfying said pre-stored user-specified criteria as to whether or not a telephone number or a name and telephone number within said information is desired to be transmitted to said pager;

transmission means for transmitting said telephone number or said name and telephone number to said paging system upon an affirmative response from said caller; and

switching means for switching said caller to an operator upon a negative response from said caller, an absence of a name or telephone number in said information, or failure to satisfy said user-specified criteria.

22. The apparatus of claim 21 wherein said transmission means comprises dialing means for dialing a pre-stored telephone number to access said paging system.

23. The apparatus of claim 21 wherein said transmission means includes a cellular connection to access said paging system.

24. The apparatus of claim 21 wherein said transmission means includes an RF network connection to access said paging system.

25. The apparatus of claim 21 wherein said transmission means includes a local or wide area network to access said paging system.

26. The apparatus of claim 21 wherein said transmission means includes a direct or leased line to access said paging system.

27. In an alphanumeric paging system, a method for capturing information transmitted with an incoming call and invoking a paging system comprising the steps of:

(a) capturing information transmitted with an incoming call;

(b) comparing said information to pre-stored user-specified criteria;

(c) prompting a caller based on said information satisfying said pre-stored user-specified criteria as to whether or not a telephone number or name and telephone number within said information is desired to be transmitted to said pager;

(d) transmitting said telephone number or said name and telephone number to said paging system upon an affirmative response from said caller;

(e) switching said caller to an operator upon a negative response from said caller, an absence of a telephone number in said information, or not satisfying said user-specified criteria; and

(f) conveying a telephone number or a name and telephone number and data to an operator for transmission of said telephone number or said name and telephone number and data to said pager based on said information satisfying said pre-stored user-specified criteria.

28. The method of claim 27 wherein step (d) further comprises dialing a pre-stored telephone number to access said paging system.

29. The method of claim 28 further comprising the step of modifying said pre-stored telephone number and said pre-stored user-specified criteria.

30. In an adjunct box in a private or computerized branch exchange or a local central office, an apparatus for capturing information transmitted with an incoming call and invoking a paging system comprising:

(a) capture means for capturing said information transmitted with an incoming call at said exchange or office; and

(b) transmission means for transmitting a telephone number or a name and telephone number within said information from said exchange or office to said paging system.

31. In an adjunct box in a private or computerized branch exchange or a local central office, a method for capturing

information transmitted with an incoming call and invoking a paging system comprising the steps of:

(a) capturing said information transmitted with an incoming call at said exchange or office; and

(b) transmitting a telephone number or a name and telephone number within said information from said exchange or office to said paging system.

32. In an adjunct box in a private or computerized branch exchange or a local central office, a method for capturing information transmitted with an incoming call and invoking a paging system comprising the steps of:

(a) capture means for capturing said information and storing a telephone number or name and telephone number of a caller from said captured information;

(b) comparing means for comparing said information to pre-stored user-specified criteria;

(c) query means responsive to said comparing means for prompting a caller based on said information satisfying said pre-stored user-specified criteria, to enter alternative or additional data to be transmitted to said paging system; and

(d) transmission means for transmitting said telephone number or said name, telephone number, and additional or alternative data to said paging system.

33. The apparatus of claim 32 wherein said query means includes means for receiving said alternative or additional data as voice or speech recognized data.

34. In an adjunct box in a private or computerized branch exchange or a local central office, a method for capturing

information transmitted with an incoming call and invoking a paging system comprising the steps of:

(a) capturing said information and storing a telephone number or name and telephone number of a caller from said captured information;

(b) comparing said information to pre-stored user-specified criteria;

(c) prompting a caller based on said information satisfying said pre-stored user-specified criteria, to enter alternative or additional data to be transmitted to said paging system; and

(d) transmitting said telephone number or said name, telephone number, and additional or alternative data to said paging system.

35. The method of claim 31 wherein step (c) includes receiving said alternative or additional data as voice or speech recognized data.

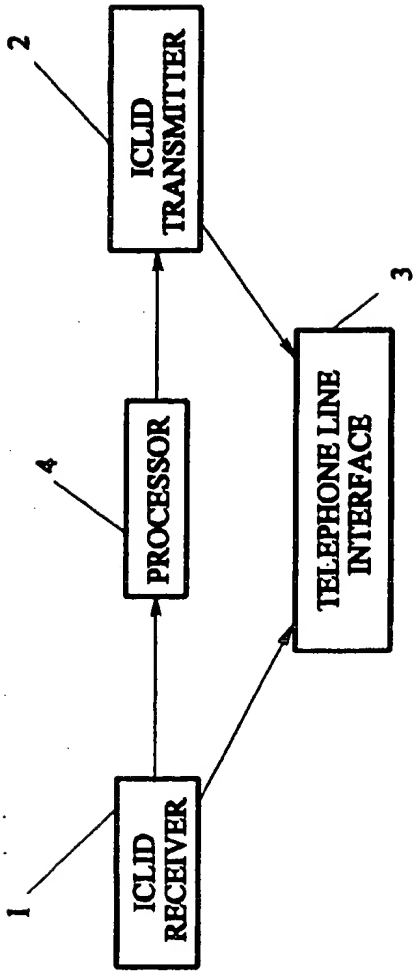


FIG.1

PRIOR ART

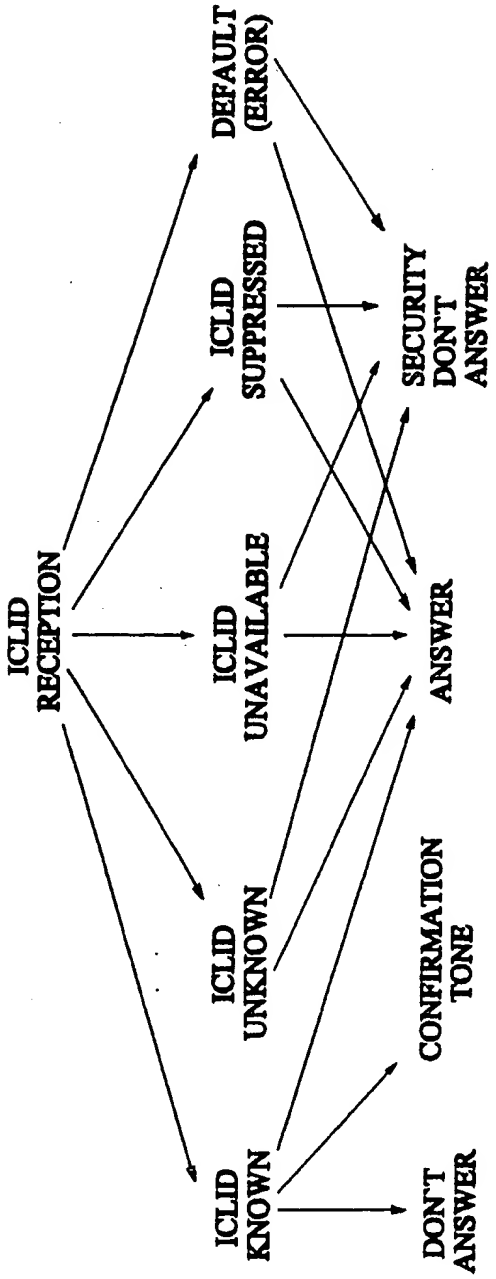


FIG.2

PRIOR ART

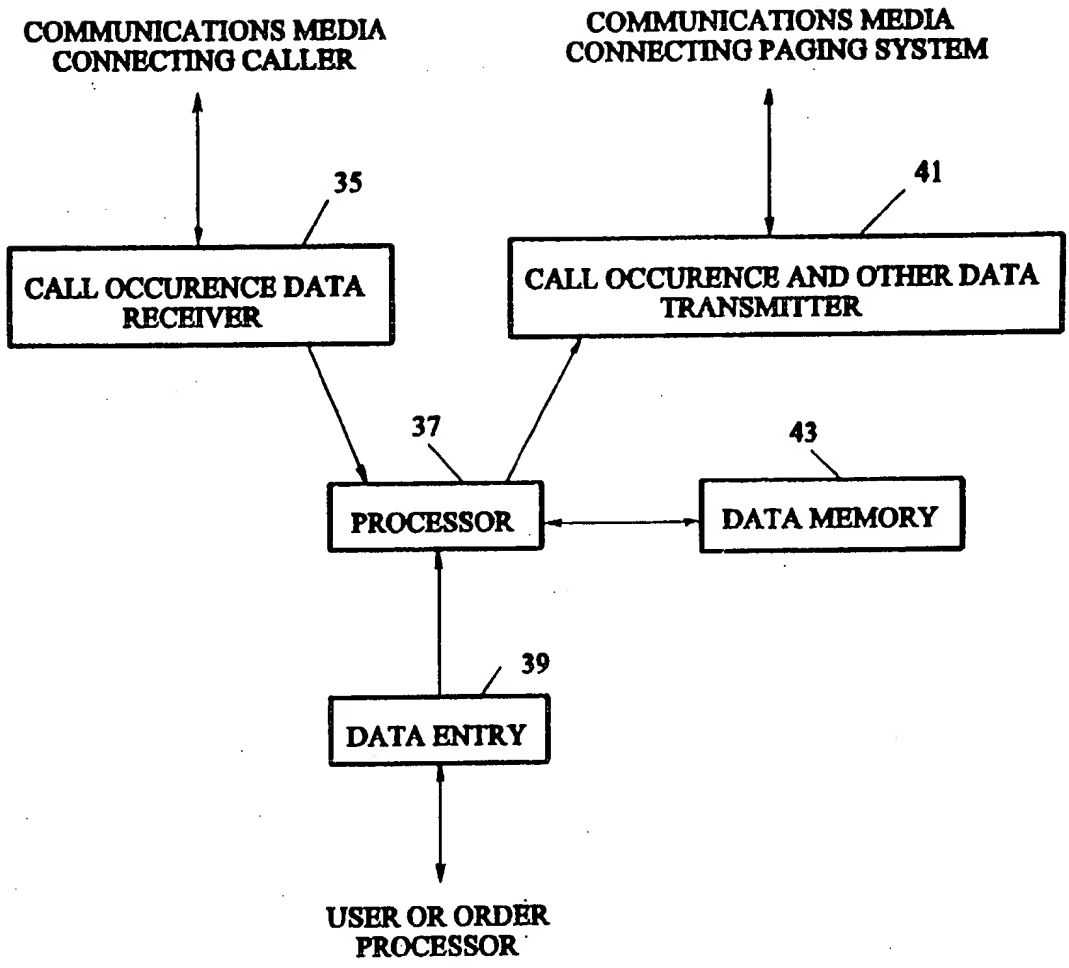
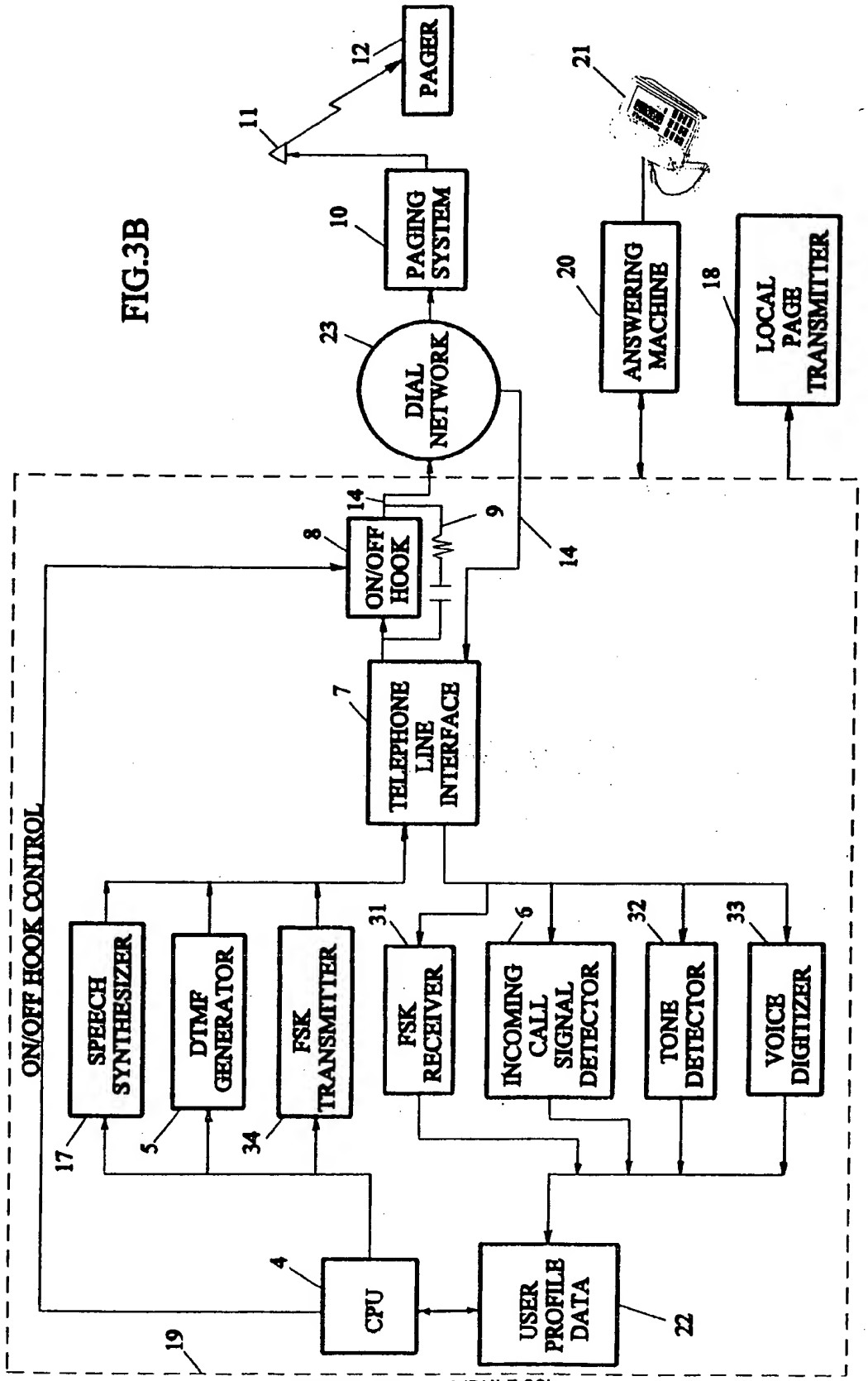

COMMUNICATIONS MEDIA CONNECTING CALLER
COMMUNICATIONS MEDIA CONNECTING PAGING SYSTEM
35
41
CALL OCCURENCE DATA RECEIVER
CALL OCCURENCE AND OTHER DATA TRANSMITTER
37
43
PROCESSOR
DATA MEMORY
39
DATA ENTRY
USER OR ORDER PROCESSOR

FIG.3A

FIG.3B


PAGER
12
11
PAGING SYSTEM
10
DIAL NETWORK
23
ANSWERING MACHINE
20
LOCAL PAGE TRANSMITTER
18
21
ON/OFF HOOK
8
14
9
14
TELEPHONE LINE INTERFACE
7
ON/OFF HOOK CONTROL
SPEECH SYNTHESIZER
DTMF GENERATOR
FSK TRANSMITTER
FSK RECEIVER
INCOMING CALL SIGNAL DETECTOR
TONE DETECTOR
VOICE DIGITIZER
31
6
32
33
17
5
34
CPU
4
USER PROFILE DATA
22
19

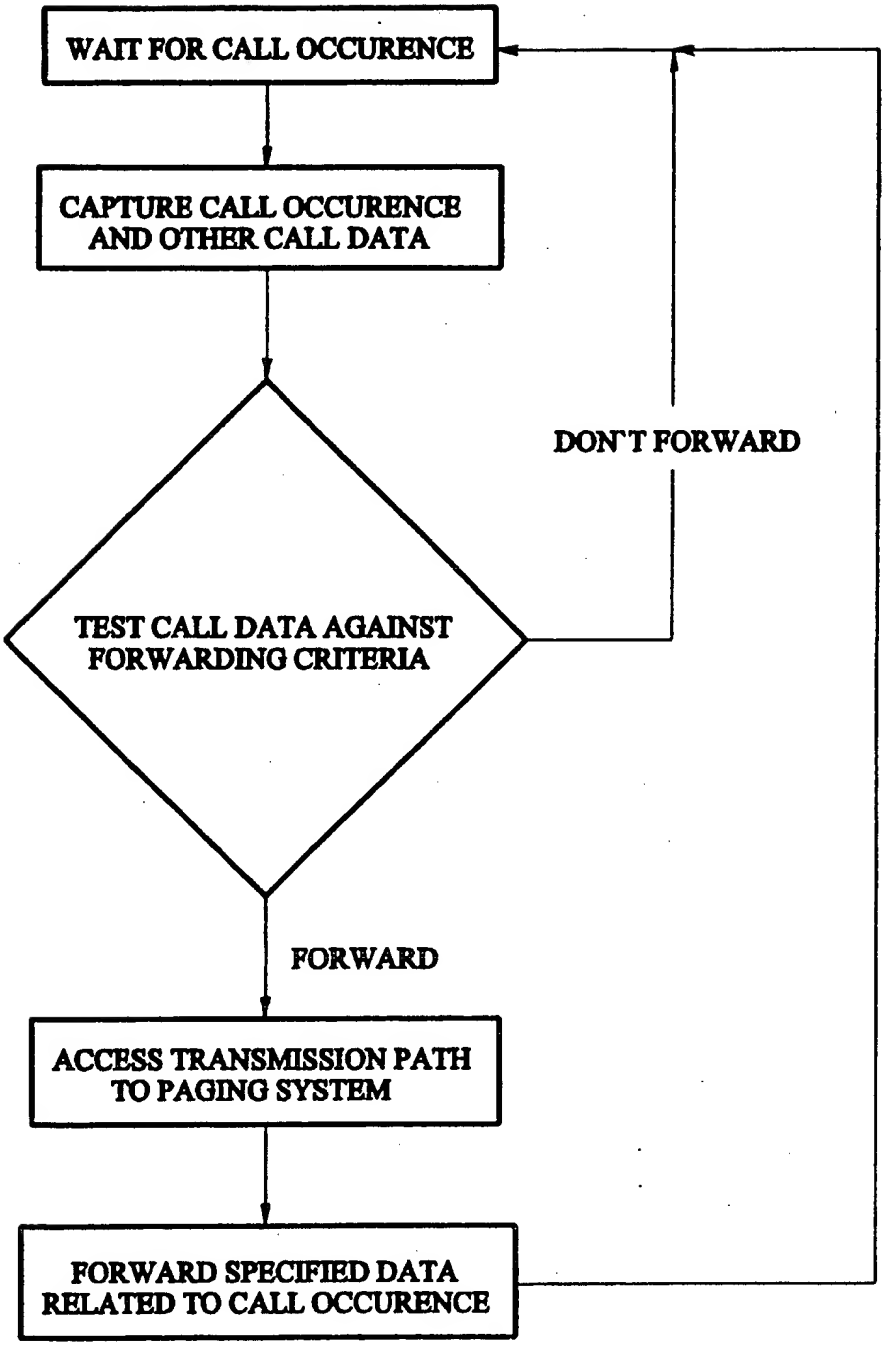

WAIT FOR CALL OCCURENCE
CAPTURE CALL OCCURENCE AND OTHER CALL DATA
TEST CALL DATA AGAINST FORWARDING CRITERIA
DON'T FORWARD
FORWARD
ACCESS TRANSMISSION PATH TO PAGING SYSTEM
FORWARD SPECIFIED DATA RELATED TO CALL OCCURENCE

FIG.3C

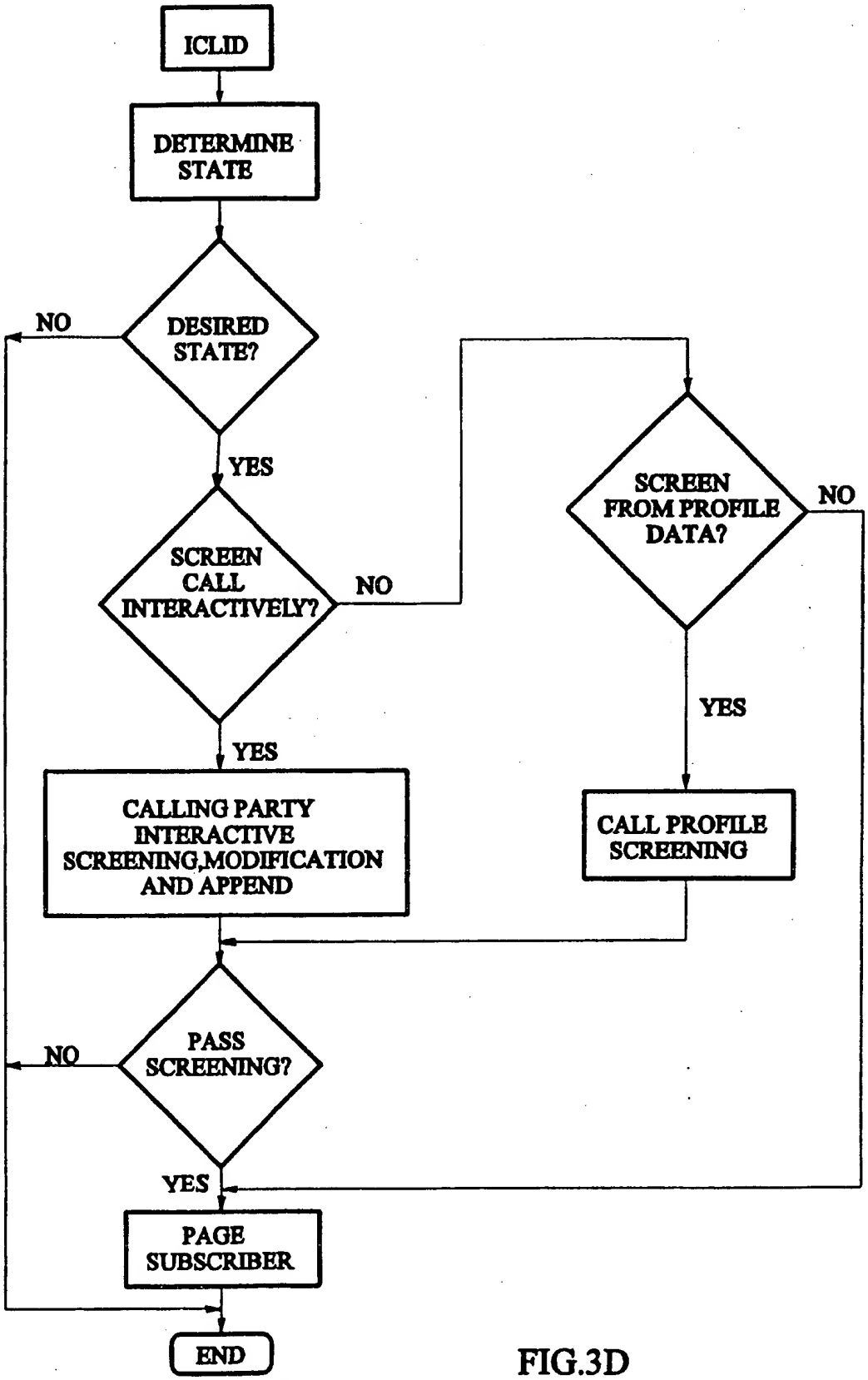

ICLID
DETERMINE STATE
DESIRED STATE?
NO
YES
SCREEN CALL INTERACTIVELY?
NO
YES
SCREEN FROM PROFILE DATA?
NO
YES
CALLING PARTY INTERACTIVE SCREENING,MODIFICATION AND APPEND
CALL PROFILE SCREENING
PASS SCREENING?
NO
YES
PAGE SUBSCRIBER
END

FIG.3D

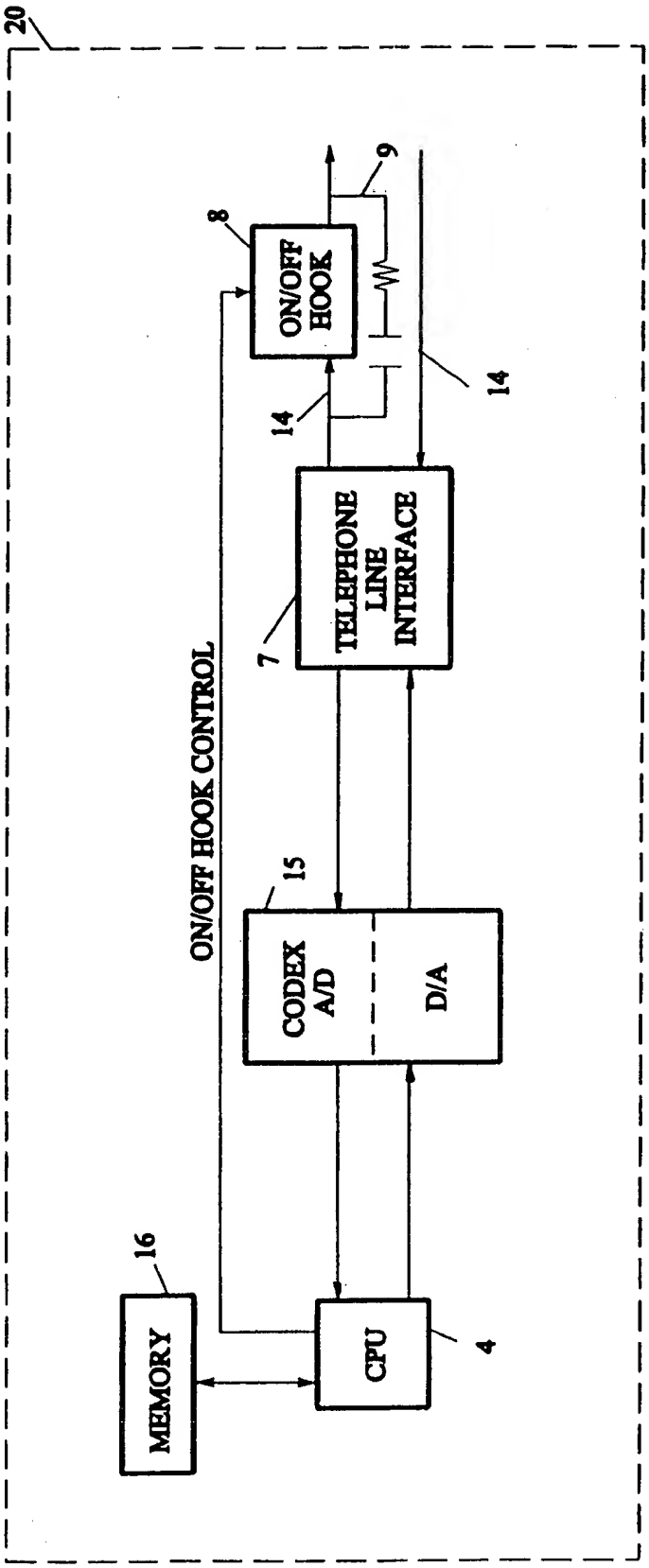

20
9
8
ON/OFF HOOK
14
14
TELEPHONE LINE INTERFACE
7
ON/OFF HOOK CONTROL
15
CODEX A/D
D/A
16
MEMORY
CPU
4

FIG.4

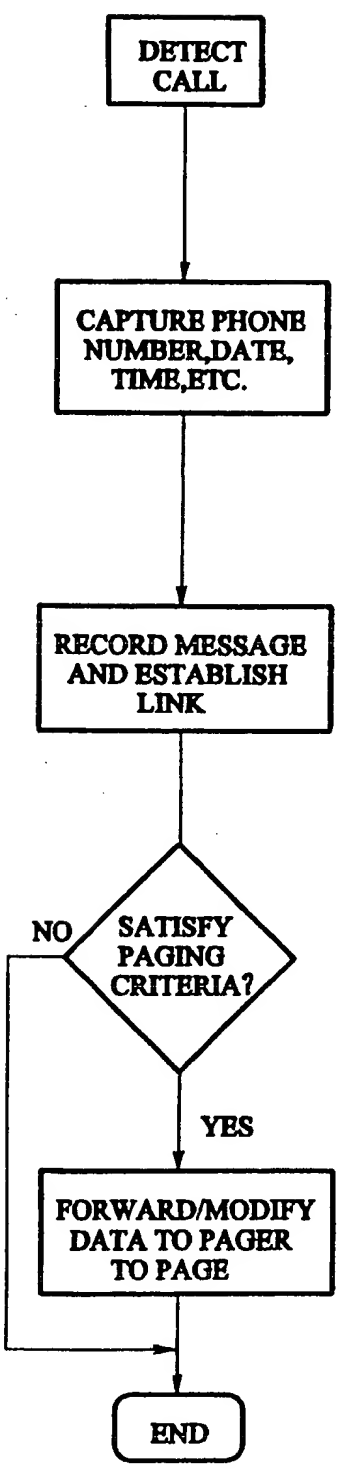

DETECT CALL
CAPTURE PHONE NUMBER,DATE, TIME,ETC.
RECORD MESSAGE AND ESTABLISH LINK
SATISFY PAGING CRITERIA?
NO
YES
FORWARD/MODIFY DATA TO PAGER TO PAGE
END

FIG.5A

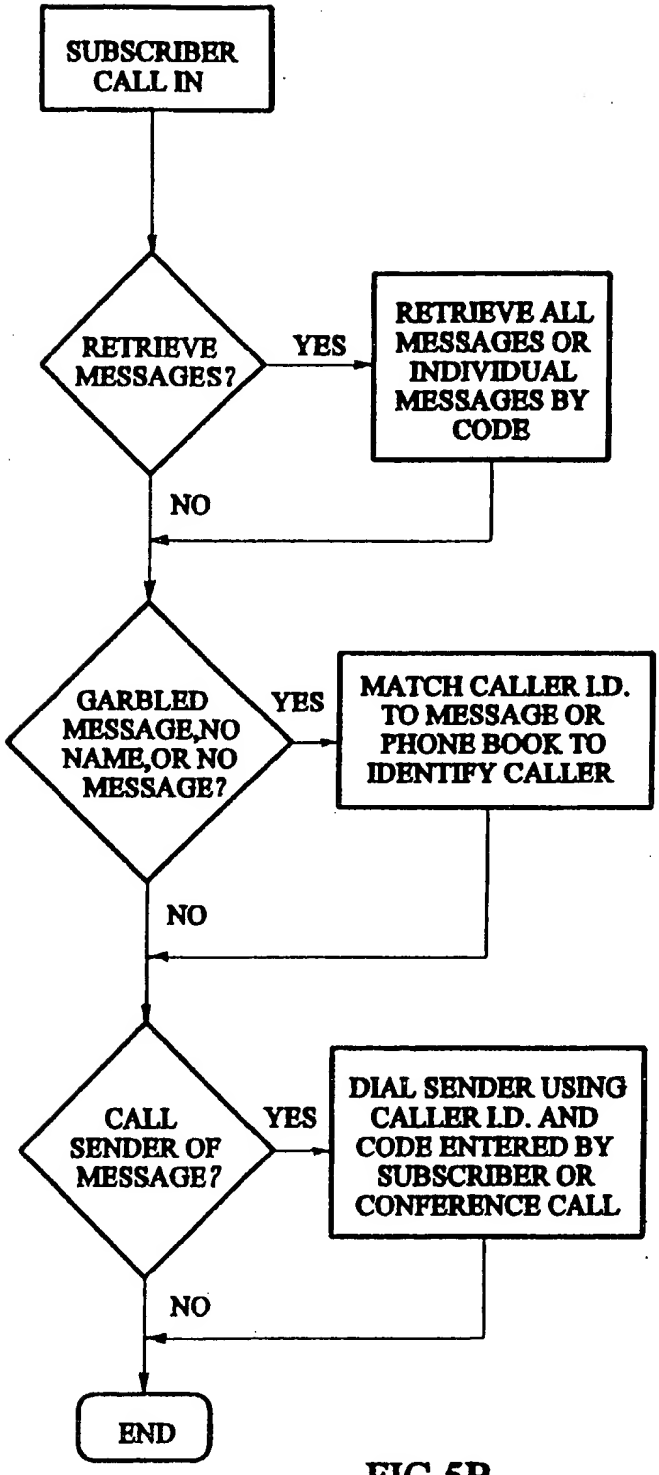

SUBSCRIBER CALL IN
RETRIEVE MESSAGES?
YES
RETRIEVE ALL MESSAGES OR INDIVIDUAL MESSAGES BY CODE
NO
GARBLED MESSAGE,NO NAME,OR NO MESSAGE?
YES
MATCH CALLER I.D. TO MESSAGE OR PHONE BOOK TO IDENTIFY CALLER
NO
CALL SENDER OF MESSAGE?
YES
DIAL SENDER USING CALLER I.D. AND CODE ENTERED BY SUBSCRIBER OR CONFERENCE CALL
NO
END

FIG.5B

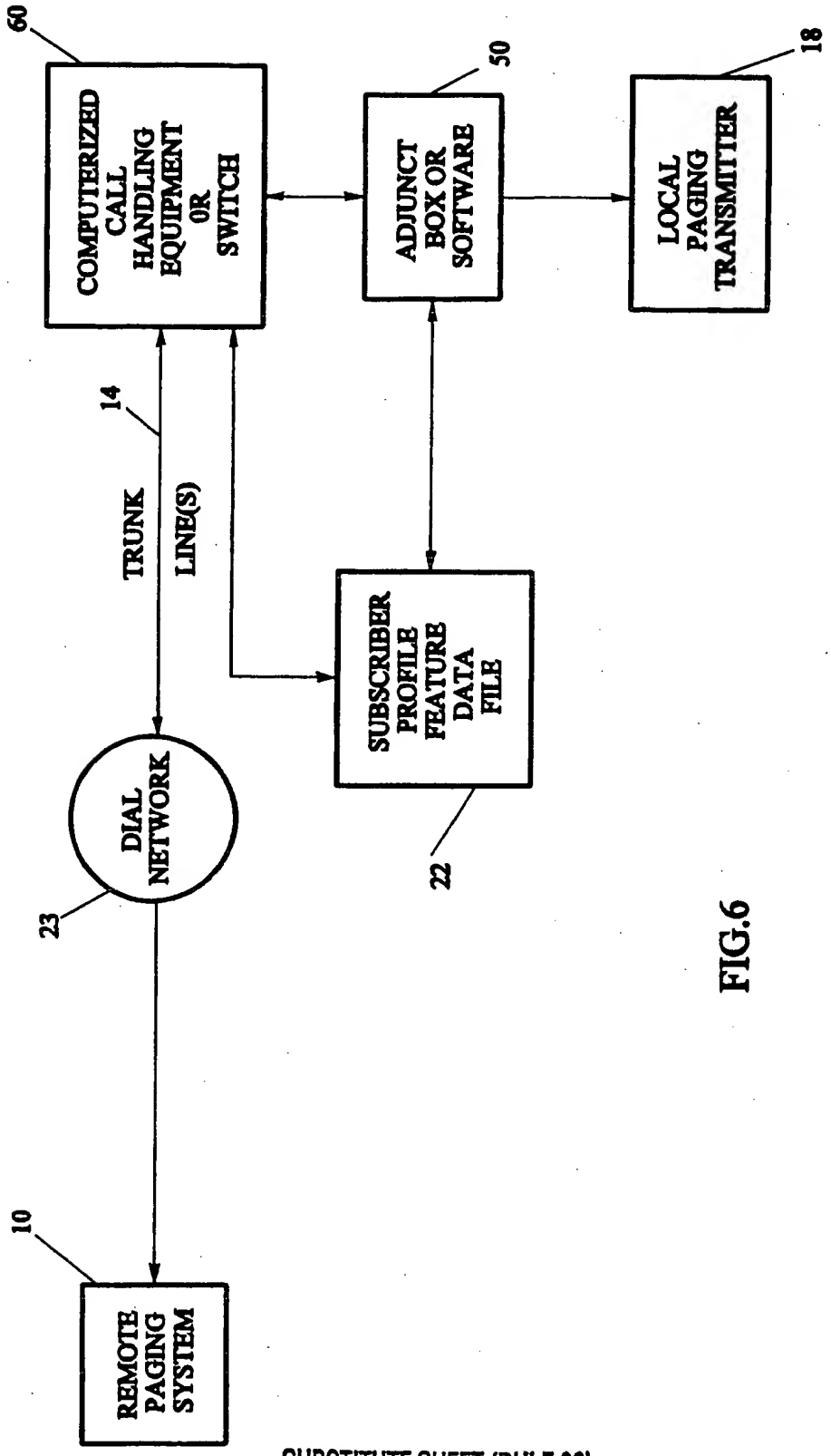

60
COMPUTERIZED CALL HANDLING EQUIPMENT OR SWITCH
50
ADJUNCT BOX OR SOFTWARE
18
LOCAL PAGING TRANSMITTER
14
TRUNK
LINE(S)
SUBSCRIBER PROFILE FEATURE DATA FILE
22
DIAL NETWORK
23
10
REMOTE PAGING SYSTEM

FIG.6

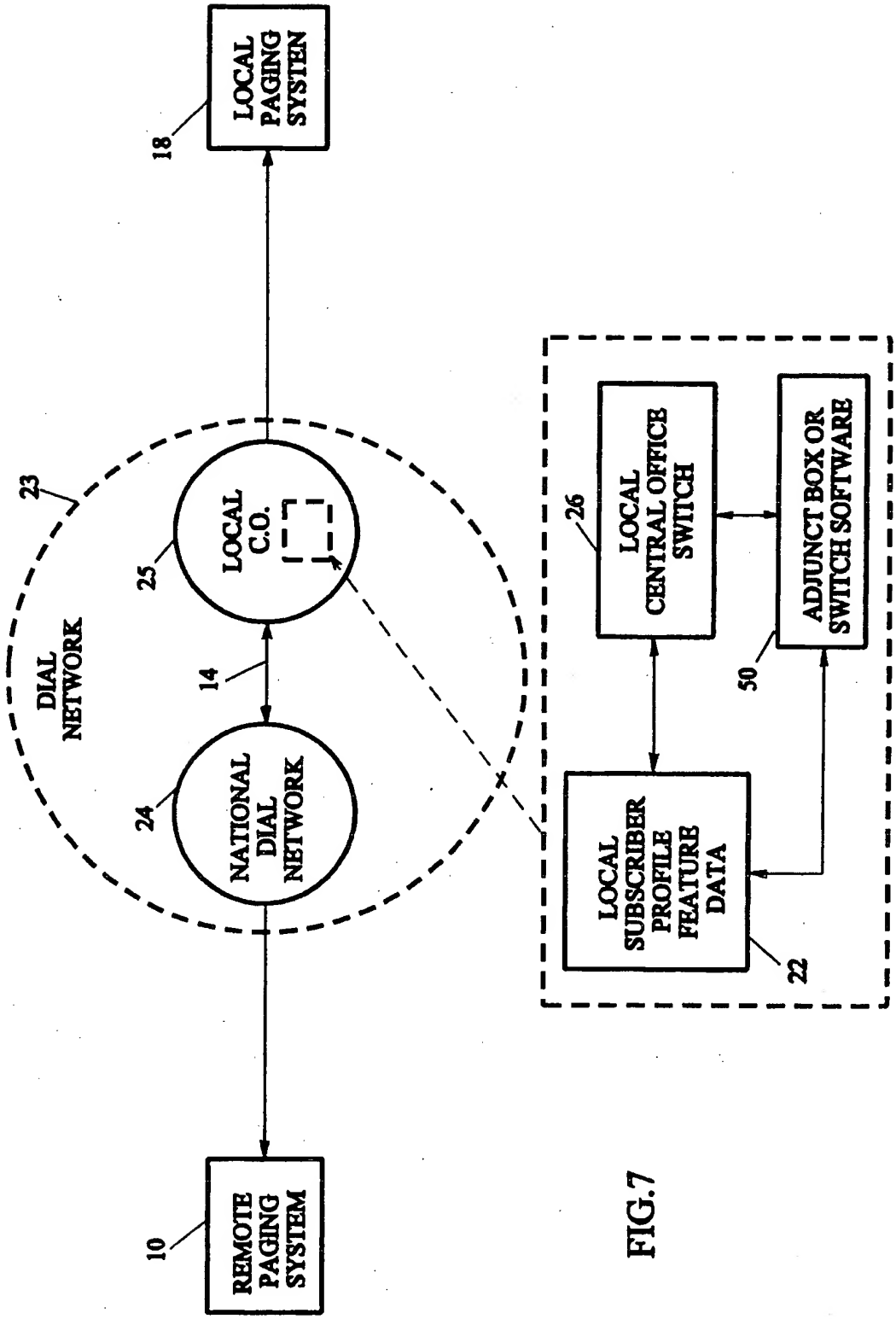

LOCAL PAGING SYSTEN
18
23
DIAL NETWORK
LOCAL C.O.
25
14
NATIONAL DIAL NETWORK
24
REMOTE PAGING SYSTEM
10
26
LOCAL CENTRAL OFFICE SWITCH
ADJUNCT BOX OR SWITCH SOFTWARE
50
LOCAL SUBSCRIBER PROFILE FEATURE DATA
22

FIG.7

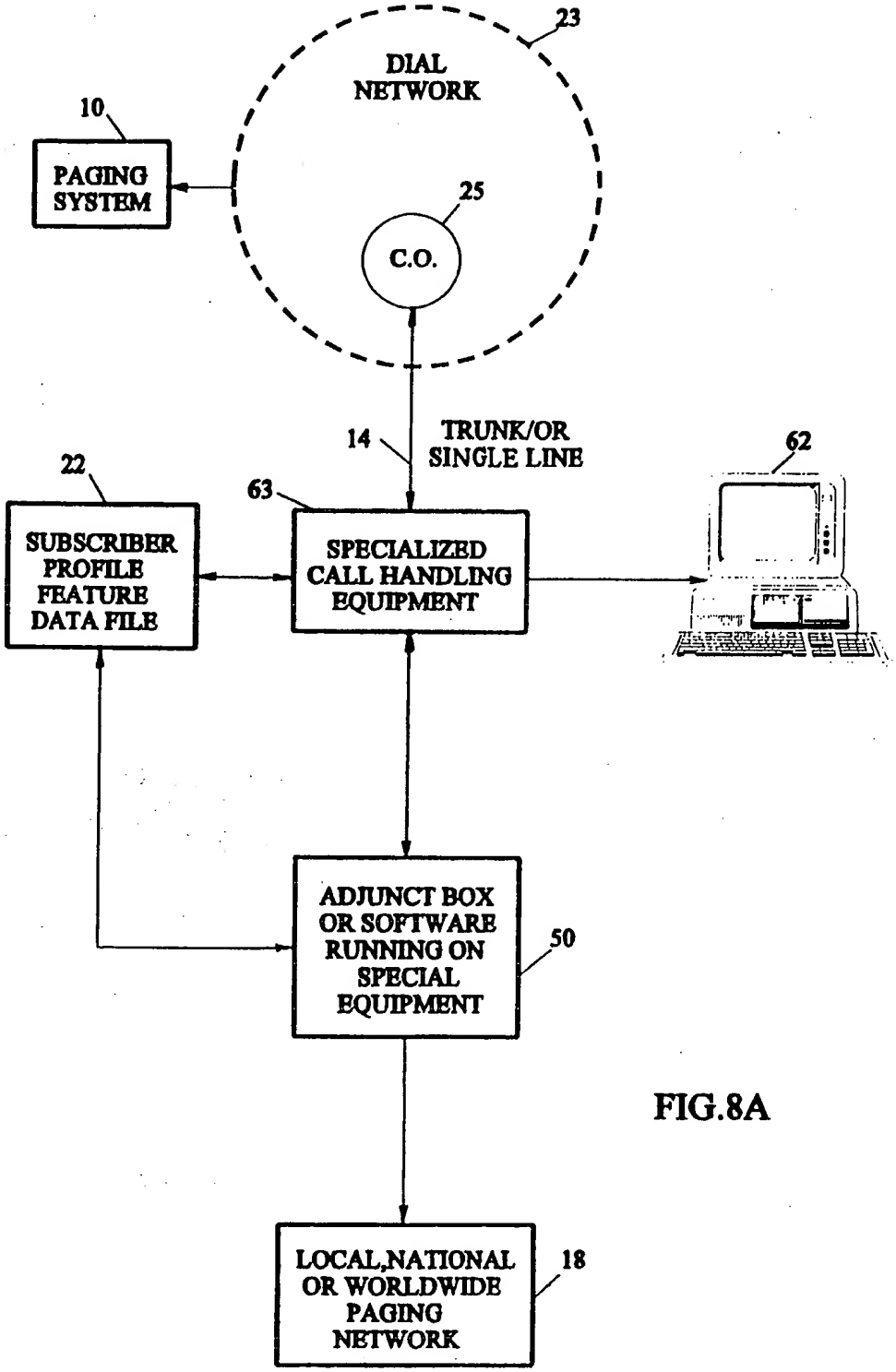
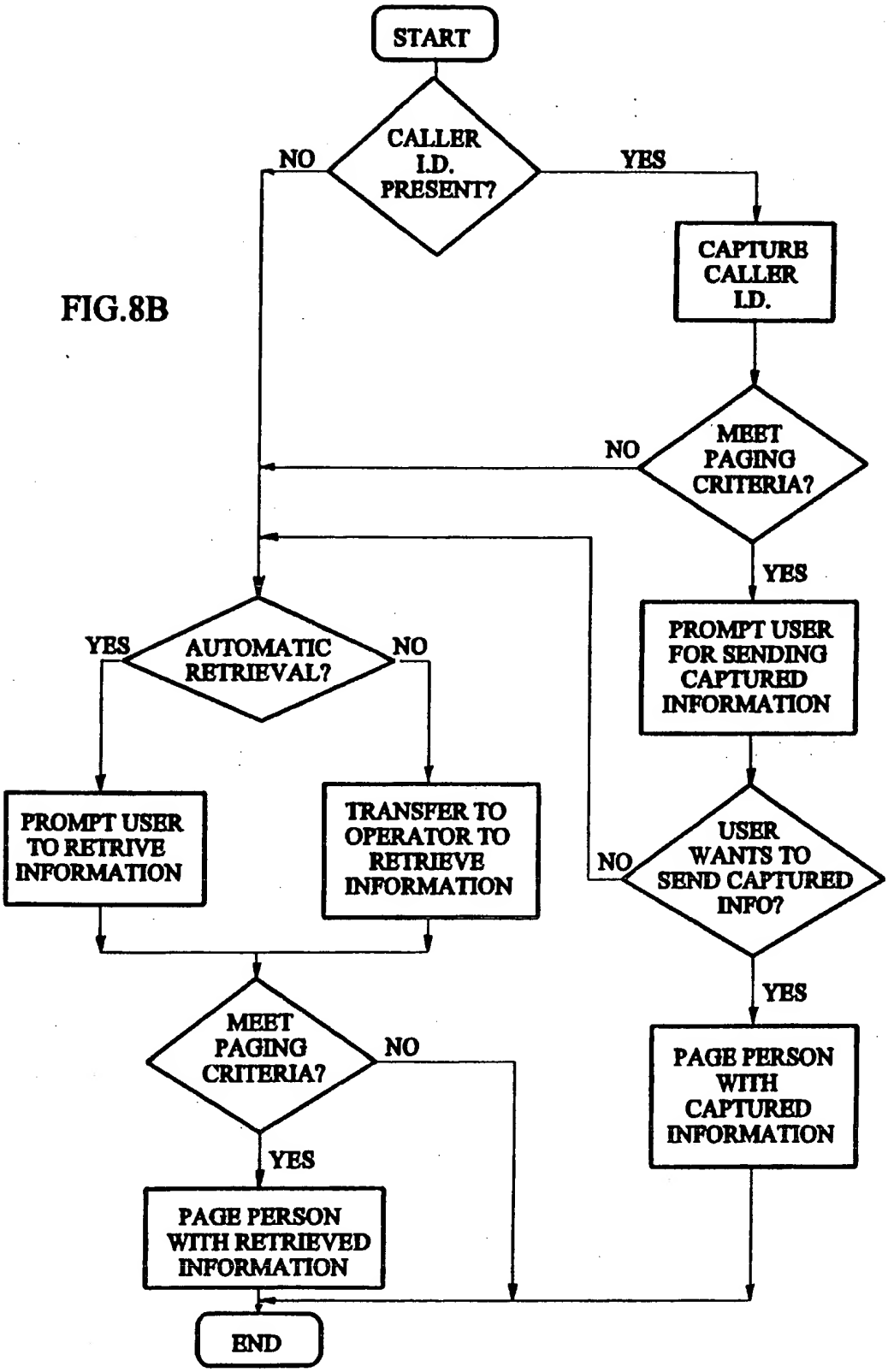

23
DIAL NETWORK
10
PAGING SYSTEM
25
C.O.
14
TRUNK/OR SINGLE LINE
62
22
63
SUBSCRIBER PROFILE FEATURE DATA FILE
SPECIALIZED CALL HANDLING EQUIPMENT
ADJUNCT BOX OR SOFTWARE RUNNING ON SPECIAL EQUIPMENT
50
LOCAL,NATIONAL OR WORLDWIDE PAGING NETWORK
18

FIG.8A

FIG.8B


START
CALLER I.D. PRESENT?
NO
YES
CAPTURE CALLER I.D.
MEET PAGING CRITERIA?
NO
YES
PROMPT USER FOR SENDING CAPTURED INFORMATION
USER WANTS TO SEND CAPTURED INFO?
NO
YES
PAGE PERSON WITH CAPTURED INFORMATION
AUTOMATIC RETRIEVAL?
YES
NO
PROMPT USER TO RETRIVE INFORMATION
TRANSFER TO OPERATOR TO RETRIEVE INFORMATION
MEET PAGING CRITERIA?
NO
YES
PAGE PERSON WITH RETRIEVED INFORMATION
END

INTERNATIONAL SEARCH REPORT

International application No.
PCT/US96/10481

A. CLASSIFICATION OF SUBJECT MATTER
IPC(6) :H04Q 7/08
US CL :379/57
According to International Patent Classification (IPC) or to both national classification and IPC

B. FIELDS SEARCHED

Minimum documentation searched (classification system followed by classification symbols)

U.S. : 379/57, 67, 88, 127, 142, 156, 157, 201, 207, 210, 211, 212, 213

Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched

Electronic data base consulted during the international search (name of data base and, where practicable, search terms used)

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
X -- Y	US, A, 4,961,216 (BAEHR ET AL) 02 OCTOBER 1990, abstract, col. 2, line 15 - col. 3, line 45, col. 4, lines 6-12.	1-2, 4, 7, 9 ---- 21-29
Y	US, A, 4,942,598 (DAVIS) 17 July 1990, abstract, figs. 2-5, col. 9, line 60 - col. 11, line 68.	3, 5, 8, 10, 21-29
Y	US, A, 5,307,399 (DAI ET AL) 26 April 1994, abstract, col. 3, lines 1-63.	6, 11, 23-26
Y	US, A, 4,893,335 (FULLER ET AL) 09 January 1990, abtract, col. 2, line 5- col. 4, line 10.	1, 21-29
Y, P	US, A, 5,511,111 (SERBETCIOGLU ET AL) 23 April 1996, abstract, figs. 1-2, 24, col. 4, line 15 - col. 6, line 22.	12-20, 23-26, 30-35

[X] Further documents are listed in the continuation of Box C. [ ] See patent family annex.

*	Special categories of cited documents:	"T"	later document published after the international filing date or priority date and not in conflict with the application but cited to understand the principle or theory underlying the invention
"A"	document defining the general state of the art which is not considered to be part of particular relevance	"X"	document of particular relevance; the claimed invention cannot be considered novel or cannot be considered to involve an inventive step when the document is taken alone
"E"	earlier document published on or after the international filing date	"Y"	document of particular relevance; the claimed invention cannot be considered to involve an inventive step when the document is combined with one or more other such documents, such combination being obvious to a person skilled in the art
"L"	document which may throw doubts on priority claim(s) or which is cited to establish the publication date of another citation or other special reason (as specified)	"&"	document member of the same patent family
"O"	document referring to an oral disclosure, use, exhibition or other means		
"P"	document published prior to the international filing date but later than the priority date claimed		

Date of the actual completion of the international search
25 SEPTEMBER 1996

Date of mailing of the international search report
04 NOV 1996

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Authorized officer
WILLIAM TROST
Telephone No. (703) 308-5318

Form PCT/ISA/210 (second sheet)(July 1992)*

INTERNATIONAL SEARCH REPORT

Int. ational application No.
PCT/US96/10481

C (Continuation). DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
X -- Y	US, A, 5,329,578 (BRENNAN ET AL) 12 July 1994, abstract, col.3, line 60 - col. 4, line 5, tables 1-5.	12-13,16-20, 30-35 ------ 14-15
A, P	US, A, 5,502,761 (DUNCAN ET AL) 26 March 1996, see whole document.	1-35
Y	US, A, 5,224,150 (NEUSTEIN) 29 June 1993, abstract, col. 4, 55 - col. 8, 15.	1, 21-29
A	US, A, 5,347,574 (MORGANSTEIN) 13 September 1994, see whole document.	12-20, 30-35
A	US, A, 5,283,818 (KLAUSNER ET AL) 01 February 1994, see whole document.	2-11

INTERNATIONAL SEARCH REPORT

International application No.
PCT/US96/10481

Box I Observations where certain claims were found unsearchable (Continuation of item 1 of first sheet)

This international report has not been established in respect of certain claims under Article 17(2)(a) for the following reasons:

1. ☐ Claims Nos.:
because they relate to subject matter not required to be searched by this Authority, namely:

2. ☐ Claims Nos.:
because they relate to parts of the international application that do not comply with the prescribed requirements to such an extent that no meaningful international search can be carried out, specifically:

3. ☐ Claims Nos.:
because they are dependent claims and are not drafted in accordance with the second and third sentences of Rule 6.4(a).

Box II Observations where unity of invention is lacking (Continuation of item 2 of first sheet)

This International Searching Authority found multiple inventions in this international application, as follows:

Please See Extra Sheet.

1. ☒ As all required additional search fees were timely paid by the applicant, this international search report covers all searchable claims.

2. ☐ As all searchable claims could be searched without effort justifying an additional fee, this Authority did not invite payment of any additional fee.

3. ☐ As only some of the required additional search fees were timely paid by the applicant, this international search report covers only those claims for which fees were paid, specifically claims Nos.:

4. ☐ No required additional search fees were timely paid by the applicant. Consequently, this international search report is restricted to the invention first mentioned in the claims; it is covered by claims Nos.:

Remark on Protest

☐ The additional search fees were accompanied by the applicant's protest.

☐ No protest accompanied the payment of additional search fees.

INTERNATIONAL SEARCH REPORT

International application No.
PCT/US96/10481

BOX II. OBSERVATIONS WHERE UNITY OF INVENTION WAS LACKING
This ISA found multiple inventions as follows:

This application contains the following inventions or groups of inventions which are not so linked as to form a single inventive concept under PCT Rule 13.1. In order for all inventions to be examined, the appropriate additional examination fees must be paid.

Group I, claim(s)1, 21-29, drawn to a paging system for receiving caller information.
Group II, claim(s) 2-11, drawn to an answering machine or voice mail system for receiving caller information.
Group III, claim(s) 12-20, 30-35, drawn to an adjunct box for receiving caller information.
The inventions listed as Groups I, II, and III do not relate to a single inventive concept under PCT Rule 13.1 because, under PCT Rule 13.2, they lack the same or corresponding special technical features for the following reasons: the special technical feature of the Group I invention is the paging system claimed therein, while the special technical feature of Group II is the answering machine/voice mail system claimed therein, and the special technical feature of Group III is the adjunct box claimed therein. Since the special technical feature of the Group I invention is not present in the Group II and III claims, the special technical feature of the Group II invention is not present in the Group I and III claims, and the special technical feature of the Group III invention is not in the Group I and II claims, unity of invention is lacking.